Marquette Intellectual Property & Innovation Law Review

Volume 25 | Issue 2 Article 6

Summer 2021

More Than Magic Wands: Analyzing Whether Enablement Analysis Of Patent Claims Created Using Artificial Intelligence Should Be Subjected To the In Re Wands Multi-Factor Analysis

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MORE THAN MAGIC WANDS: ANALYZING WHETHER ENABLEMENT ANALYSIS OF PATENT CLAIMS CREATED USING ARTIFICIAL INTELLIGENCE SHOULD BE SUBJECTED TO THE *IN RE WANDS* MULTI-FACTOR ANALYSIS

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I. INTRODUCTION

The United States federal courts and the United States Congress ("Congress") have continuously risen to the challenge of modifying and interpreting patent law statutes over recent decades to keep pace with

technological advancements.[1] These modifications and interpretations assisted the United States Patent and Trademark Office (the "USPTO") by furthering its goals of protecting the invested efforts of inventors while incentivizing further invention.[2] As patent law approaches the quarter mark of the twenty–first century the use of artificial intelligence in methods or processes to invent new products, services, and solutions is becoming more prevalent and, in some industries, is replacing the role of the traditional brick and mortar human inventor.[3] This growing trend of technology-assisted invention creates copious amounts of uncertainty in patent law for inventors looking to acquire a patent or defend the validity of their prospective patents.[4]

One particular area of uncertainty is how the USPTO and the federal courts will apply enablement analysis to the use of artificial intelligence during an intermediate step of a process. The current guidance of the federal courts was established in *In re Wands*, which presents enablement analysis through a multi-factor test to determine whether a Person Having Ordinary Skill In The Art (PHOSITA) would be able to make and use all of the specifications of the patented process without "undue experimentation."[5] Although these factors have served as an effective way to evaluate man-made inventions, the factor analysis is muddied when applied to inventions created using artificial intelligence. The factor analysis is muddied because there is an absence of clarity as to who or what would constitute a PHOSITA and what amount of experimentation is undue in such an unpredictable field.

In response to this growing concern this comment recommends that the USPTO and the federal courts adopt an interpretation of enablement that supports the inventor's use of artificial intelligence narrowly during a specific method step, as long as the artificial intelligence use can be explained and subsequently performed by a different PHOSITA standard. This different PHOSITA standard would employ a comparable information system tailored in that art to assist the skilled person. The different standard would also require artificial intelligence-specific modifications to some of the existing enablement factors. This recommendation only applies to artificial intelligence-assisted patents, leaving settled enablement precedent for non-artificial intelligence-assisted patents unabated.

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1. 1 PETER S. MENELL, MARK A. LEMLEY & ROBERT P. MERGES, INTELLECTUAL PROPERTY IN THE NEW TECHNOLOGICAL AGE: 2019 156–60, 167–68 (Clause 8 Publishing 2019).

2. *Id.* at 167.

3. W. Michael Schuster, *Artificial Intelligence and Patent Ownership*, 75 WAS. & LEE L. REV. 1945, 1946–48 (2018).

4. *Id.*

5. *In re* Wands, 858 F.2d 731, 737 (Fed. Cir. 1988).

Section II of this comment defines artificial intelligence and discusses how artificial intelligence may be used to assist inventors in the creation of patentable inventions. Section III of this comment introduces patent enablement analysis. In addition, this section discusses the undue experimentation multi-factor test and the problems posed by the test's application to inventions identified or produced through the use of artificial intelligence. Then section III describes how the federal courts assess inventorship in cases where an inventor's participation is passive. Section IV of this comment presents a synopsis of Federal Circuit court enablement decisions for biotechnology method patents involving unpredictable subject matter. These decisions are informative because artificial intelligence-assisted methods share this unpredictability. This section identifies three observations from Federal Circuit court decisions that drive unpredictable biotechnology method patent enablement and applies these considerations to artificial intelligence-assisted method patents. Finally, section V of this comment suggests potential solutions for patent enablement analysis where artificial intelligence is employed.

This comment concludes that slight modifications to the *In re Wands* test in both the PHOSITA standard and the specific undue experimentation factors may assist the federal courts and the USPTO with analysis of artificial intelligence-assisted patents. This comment will not address the separate issues of patentability, the doctrine of equivalents, or the infringement of patents that involve artificial intelligence in some capacity.

II. ARTIFICIAL INTELLIGENCE AND ITS ADVANCING IMPACT

In recent decades the concept of artificial intelligence has evolved from its public perception rooted in science fiction—portrayals such as Rosie the Maid in the Jetsons[6] television show or the portrayal of the evil Ash in the Alien[7] film franchise—to a means of efficiently receiving solutions to complex problems, such as IBM's Watson.[8] Regardless of whether science fiction embodiments such as these are still rooted in the minds of the public, artificial intelligence is continuously used in many industries to aid invention and operate in a capacity that saves inventors both time and resources.[9]

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6. *The Jetsons* (Hanna-Barbera Productions 1962) (presenting the family maid, Rosie the Robot).

7. ALIEN (Twentieth Century-Fox Productions 1979) (chronicling a human space expedition guided by an artificial intelligent system disguised as a human named Ash).

8. *IBM Watson*, IBM, https://www.ibm.com/Watson (last visited February 2, 2020) (presenting the artificial intelligence solution available for license).

9. Sean Semmler & Zeeve Rose, *Artificial Intelligence: Application Today and Implications Tomorrow*, 16 DUKE L. & TECH REV. 85, 86–87 (2017).

Black's Law Dictionary defines artificial intelligence as autonomous "software used to make robots [or systems] work better than humans[; t]he systems are rule based or neural networks."[10] Neural networks are less rule-based in design because they are constructed to operate akin to brain activity by determining informational relevancy.[11] In their article concerning the patentability of artificial intelligence systems, "When Artificial Intelligence Systems Produce Inventions: An Alternative Model for Patent Law at the 3A Era," Dr. Yanisky Ravid and Xiaoquiong Liu identified eight crucial features of these systems that support their inventiveness:

(1) Creativeness;
(2) Unpredictability;
(3) Independence and autonomy;
(4) Rationality;
(5) Evolution;
(6) Capability of data collection and communication;
(7) Efficiency and accuracy; and
(8) Freedom of choice among alternative options.[12]

These inventive features of artificial intelligence support the social benefit component of patent law's purpose by furthering advancement of nationwide industries, protecting the investment of inventors, and publishing inventions so that they can be generally used by the public after the protection period expires.[13]

Although some attention has been given by legal scholars to address the question of whether artificial intelligence can serve as a person in the arenas of constitutional law[14] or real property rights,[15] this comment proceeds under the

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10. *Artificial Intelligence*, BLACK'S LAW DICTIONARY, TheLawDictionary.org, https://thelawdictionary.org/search2/?cx=partner-pub-2225482417208543%3A5634069718&cof=FORID%3A11&ie=UTF-8&q=artificial+intelligence&x=0&y=0 (last visited January 25, 2020).

11. Dana S. Rao, *Neural Networks: Here, There, and Everywhere—An Examination of Available Intellectual Property Protection for Neural Networks in Europe and the United States*, 30 GEO. WASH. J. INT'L L. & ECON. REV. 509, 509-11 (1997).

12. Dr. Shlomit Yanisky Ravid & Xiaqiong Liu, *When Artificial Intelligence Systems Produce Inventions: An Alternative Model for Patent Law At The 3A Era,* 39 CARDOZO L. REV. 2215, 2224–28 (2008).

13. 1 MENELL, LEMLEY & MERGES, *supra* note 1, at 167.

14. Lawrence B. Solum, *Legal Personhood for Artificial Intelligences*, 70 N.C. L. REV. 1231, 1255 (1992).

15. *See* David Marc Rothenberg, *Can Siri 10.0 Buy Your Home? The Legal and Policy Based Implications of Artificial Intelligent Robots Owning Real Property*, 11 WASH. J.L. TECH. & ARTS REV. 439, 447 (2016).

assumption that such rights will not be bestowed to artificial intelligence in patent law.

Given artificial intelligence's evolution and crucial features, its use has become common in the inventive process for inventors who can afford to use it.[16] Particularly in method patents, artificial intelligence has created the opportunity to aid inventors by performing a step or component of a method that would have been deemed too burdensome to accomplish in prior decades.[17] Additionally, when artificial intelligence is used as either a tool or a step in a method or process, the inventor is able to create new, non-obvious, and useful inventions that would be theoretically patentable if the inventor performed the intelligent function instead of the system.[18] Due to this phenomenon, the issue of enablement carries more weight because it is plausible that (1) the inventor may not know with a sufficient level of certainty what the system explicitly did to perform the relevant step in the method or process, or (2) the inventor may not be able to explain how another person would perform the step without an undue amount of experimentation.

III. ENABLEMENT AND THE BARRIERS TO VALIDITY

Enablement is a key component of the disclosure process when assessing patent validity.[19] Enablement has been codified by Congress in the America Invents Act (the "AIA"), found at 35 U.S.C. § 112(a).[20] According to Section 112(a), the patent's "specification shall contain . . . the manner and process of making and using [the patent], in such full, clear, concise, and exact terms as to enable any person skilled in the art to which it pertains, or with which it is most nearly connected, to make and use the same."[21] In summary, the enablement test addresses each patent claim specification, requires an instruction of how one can make or use the patented method, and determines whether a PHOSITA would understand the specification and be able to use or perform each patent claim.[22] The part pertaining to the PHOSITA's ability to use or perform each patent claim is qualified to require that the use or performance shall not require "undue experimentation."[23]

This comment's coverage of the enablement test is dissected into four main components. Section A presents the federal courts' definition of a PHOSITA

16. Schuster, *supra* note 3, at 1999–2000.
17. Ravid & Liu, *supra* note 12, at 2219–20.
18. Schuster, *supra* note 3, at 1947–48.
19. 35 U.S.C. § 112(a) (2012).
20. *Id.*
21. *Id.*
22. 1 MENELL, LEMLEY & MERGES, *supra* note 1, at 258.
23. *Id.* at 264.

in enablement analysis. Section B explains the undue experimentation factors employed by the federal courts after *In re Wands*. Section C outlines the undue experimentation factor deficiencies when applied to artificial intelligence-assisted inventions. Lastly, Section D cites cases where the federal courts addressed the issue of whether patent inventions are credited to a party that merely funded or directed the invention.

A. PHOSITA Analysis in the Federal Courts

Much like the "reasonable person" standard in tort law, the use of a PHOSITA imposes an objective standard on court analysis.[24] The PHOSITA is also akin to the reasonable person standard because despite its codification within the enablement statute, the PHOSITA standard is used in other elements or areas of analysis in patent law.[25] Although the use of PHOSITA is codified in different sections of the Patent Act, the definition and principles underlying the term remain consistent.[26] However, a key distinction between the reasonable person and the PHOSITA standards is that the PHOSITA standard is more stringent because the PHOSITA must have "skill in the art," whereas a reasonable person must only be a rational person.[27]

The section of patent law where the PHOSITA definition is most mature is within the non-obviousness element of patentability, codified in 35 U.S.C. § 103(a).[28] In the 1995 Federal Circuit case, *In re GPAC Inc.*, the court implemented a five-factor test for determining the level of ordinary skill in PHOSITA analysis.[29] These factors are (1) "type of problems encountered in the art," (2) "prior art solutions to those problems," (3) "rapidity with which innovations are made," (4) "sophistication of the technology," and (5) "educational level of active workers in the field."[30] The analysis of each factor is employed on a case-by-case basis and not all factors are required.[31]

Since *In re GPAC Inc.*, the interpretation of the PHOSITA in non-obviousness analysis has been narrowed by the Supreme Court in *KSR International Co. v. Teleflex Inc.*[32] Here, the Court held that the lower courts had erred in finding that a claim of the patented invention where two patents

24. *See id.*
25. *Id.* at 227, 264.
26. *Id.*; *see* 35 U.S.C. § 112(a) (2012); *see also* 35 U.S.C.A. § 103 (West 2011).
27. 1 MENELL, LEMLEY & MERGES, *supra* note 1, at 264.
28. 35 U.S.C.A. § 103 (West 2011).
29. *In re* GPAC Inc., 57 F.3d 1573, 1579 (Fed. Cir. 1995).
30. *Id.*
31. *Id.*
32. KSR Int'l Co. v. Teleflex Inc., 550 U.S. 398 (2007).

serving different purposes were combined was non-obvious.[33] Although this case addresses the issue of non-obviousness at its core, two essential points concerning the PHOSITA standard as it relates to artificial intelligence-assisted invention were made.[34]

First, Justice Kennedy declared that "[a] person of ordinary skill is also a person of ordinary creativity, not an automation."[35] This statement is particularly damning to the use of artificial intelligence to assist or perform inventions because artificial intelligence can be classified as an automation given its design.[36] Also, depending on how it is used, artificial intelligence would likely exceed Justice Kennedy's standard of ordinary creativity because it processes information faster and has access to more information than an ordinary human with skill in the art.

Second, Justice Kennedy qualified the difference between innovation and ordinary skill when he wrote:

> When there is a design need or market pressure to solve a problem and there are a finite number of identified, predictable solutions, a person of ordinary skill has good reason to pursue the known options within his or her technical grasp. If this leads to the anticipated success, it is likely the product not of innovation, but of ordinary skill and common sense.[37]

Although this statement does not appear to stray beyond obviousness, it notes an essential ambiguity related to the finite number of identified, predictable solutions compared to ordinary skill.[38] Artificial intelligence that is capable of participation in the inventive process would require the definition of a finite number of identified, predictable solutions to be reconsidered based on its enhanced capabilities.[39]

In summary, the precedent of the federal courts require all inventions or existing patents to be reviewed using a "person" as a PHOSITA when performing enablement analysis. Despite the court's direction to perform this analysis on a case-by-case basis, current litigation under the traditional PHOSITA standard does not appear likely to deem artificial intelligence-assisted invention favorably.

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33. *Id.* at 420–22.
34. *See id.*
35. *Id.* at 421
36. Ravid & Liu, *supra* note 12, at 2249–50.
37. *KSR Int'l Co.*, 550 U.S. at 421.
38. Ravid & Liu, *supra* note 12, at 2249–50.
39. *Id.*

B. Undue Experimentation Factors

In response to the need for a uniform undue experimentation standard for enablement, Justice Smith, writing for the Federal Circuit Court of Appeals, created a multi-factor test in the 1988 case, *In re Wands*.[40] Justice Smith's test included the following factors:

(1) The quantity of experimentation necessary;
(2) The amount of direction or guidance presented;
(3) The presence or absence of working examples;
(4) The nature of the invention;
(5) The state of the prior art;
(6) The relative skill of those in the art;
(7) The predictability or unpredictability of the art; and
(8) The breadth of the claims.[41]

Each factor is assessed for each individual patent claim using the court's interpretation of the patent claims and the current technology available at the time of the patent filing.[42] After analyzing each factor, the court determines whether the use or performance of each claim by a PHOSITA would require undue experimentation.[43] It is important to note that even though a patent may be initially denied by the USPTO for lack of enablement, a patent may also be considered invalid years after the patent is awarded if a federal court finds the patent claim to be subject to undue experimentation.[44]

C. Artificial Intelligence-Assisted Invention Is Undue Experimentation

Although the *In re Wands* factors[45] work effectively for human inventions and give the court enough leeway to make a fair decision, the factors' application to processes or methods invented using artificial intelligence is extremely limited. Many of these limitations are predicated upon the unknown interpretation of who or what the PHOSITA should be.

If the PHOSITA is interpreted as a dynamic system with ordinary skill in the art akin to the software used to create or perform the step in the patented process, then there is a higher probability that the experimentation performed on claims involving artificial intelligence would not be undue. However, the

40. *In re* Wands, 858 F.2d 731, 737 (Fed. Cir. 1988).
41. *Id.*
42. *Id.*
43. 1 MENELL, LEMLEY & MERGES, *supra* note 1, at 264.
44. USPTO, *The Enablement Requirement*, MANUAL OF PATENT EXAMINING PROCEDURE 2164.06(b), https://www.uspto.gov/web/offices/pac/mpep/s2164.html (last updated June 25, 2020).
45. *In re Wands*, 858 F.2d at 737.

existence of a dynamic system with ordinary skill in the art is purely speculative because there is no assurance that such a dynamic system exists or could be utilized to successfully perform patent claim experimentation. Alternatively, if the federal courts interpret the PHOSITA as a human akin to the patent filer in accordance with established non-artificial intelligence-assisted patents, then even a simple artificial intelligence function performed in a claim may constitute undue experimentation under the *In re Wands* factors because such experimentation would be extremely extensive without similar software.

Despite the court's silence on its interpretation of a PHOSITA for artificial intelligence-assisted patents, it is important to highlight that no matter which PHOSITA definition is applied, the multi-factor test still faces serious problems when applied to an artificial intelligence-assisted solution. For example, the first factor, "the quantity of experimentation necessary,"[46] is limited because, through the autonomous learning of artificial intelligence, it could demand a multitude of iterations for even a fellow "ordinary" artificial intelligence solution to receive the "intelligence" necessary to perform the appropriate experimentation. Also, it would be extremely difficult for an inventor to articulate the experimentation steps necessary in a claim that would capture the necessary quantity of experimentation. As a result, it is unlikely that an invention created with the use of artificial intelligence could ever avoid the undue experimentation threshold for the first factor under the current test.

Similar to factor one, when analyzing factors two (amount of direction or guidance presented)[47] and three (presence or absence of working examples)[48] it is likely that each factor would face similar scrutiny and be deemed invalid due to undue experimentation. Factor two hinges on the ability to articulately craft claim language that both captures the actions of the artificial intelligence system and is stated in a way that would allow a human or a non-equivalent system to reperform the work.[49] Factor three will likely default as undue experimentation because it is unlikely that an inventor using artificial intelligence would create multiple working examples of the artificial intelligence-related claim as a means of experimentation.[50]

The limitations of the first three factors foreshadow hinderances that will likely be found in factors six (relative skill of those in the art)[51] and eight (breadth of the claims)[52] as well. Factor six would likely default in favor of

46. *Id.*
47. *Id.*
48. *Id.*
49. *See id.*
50. *See id.*
51. *Id.*
52. *Id.*

undue experimentation because the current standard portrays the PHOSITA as a human, and a human would not be capable of efficiently performing the step that was completed by the artificial technology software.[53] Factor eight differs from the aforementioned factors because the breadth of the claims is solely dependent upon the nature of the invention process and the final result obtained.[54] However, because determining the exact logic used by the artificial intelligence system at a point in time is very difficult, this factor would still cause uncertainty by way of undue experimentation.

D. Federal Caselaw on Human Inventorship

In addition to the dreary landscape for artificial intelligence-assisted inventions on the grounds of the PHOSITA definition and undue experimentation factors, federal case law concerning the role of the inventor in technology-assisted inventions also appears damning. In *Nartron v. Schukra U.S.A., Inc.*, the Federal Circuit held that a patent filer must go beyond providing information about the current state of the art to satisfy the enablement requirement as a human inventor.[55] In another case, the Eastern District Court of Texas ruled that a human inventor must do more than conceive of the idea or goal for an invention that is later executed by another.[56] A later case from the Eastern District of Michigan held that a human is not an inventor if they did not participate in the invention aside from providing funding and instructing others to create new technology.[57] These holdings from three separate federal courts reason that the assistance of others, whether human or artificial intelligence, to achieve a desired invention will likely suffer denial on grounds of enablement.[58] This denial seemingly applies even when the invention itself would have survived enablement when executed solely by the individual.[59]

IV. ENABLEMENT CASELAW: UNPREDICTABILITY IN BIOTECHNOLOGY METHOD PATENTS

Given the unpredictability of artificial intelligence-assisted method patents, Federal Circuit decisions addressing the role of unpredictability in biotechnology method patents can serve as an important reference point. One particular area of unpredictability in biotechnology method patents that has

53. *See id.*
54. *Id.*
55. Natron v. Schukra U.S.A., Inc., 558 F.3d 1352 (Fed. Cir. 2009).
56. Oasis Research, LLC v. Carbonite, Inc., 2015 WL 123642 (E.D. Texas 2015).
57. TS Holdings, Inc. v. Schwab, 2011 WL 13205959 (E.D. Mich. 2011).
58. Ravid & Liu, *supra* note 12, at 2249–50.
59. *Id.*

been well adjudicated is where the patent addresses biological materials or biological reactions.[60] Akin to artificial intelligence-assisted method patents, these patents face a problem when attempting to offer examples to enable its broad claims.[61]

When surveying Federal Circuit decisions that address the enablement of unpredictable biotechnology method patents,[62] there are three observations that are informative for artificial intelligence-assisted method patents. Section A explains the first observation that a method patent claim must offer more than a starting point for further iterative research. Section B presents the second observation that there must be an example given for each diverse and poorly understood group included in a method patent's claimed genus. Section C discusses the third observation that the breadth of the entire claim must be possible at the time of the claim's filing. Lastly, Section D applies these observations to artificial intelligence-assisted method patents.

A. Observation One: More Than a Starting Point for Further Research

The Federal Circuit has required that a biotechnology method patent claim must offer more than a starting point for further iterative research in order to substantiate the claim when related to unpredictable subject matter.[63] This characteristic was an important consideration in *Wyeth & Cordis Corp. v. Abbott Laboratories*.[64] There, the patent claim concerned a health treatment method involving a single bacterium's structural compound, but the patent specification did not offer guidance on how to maintain the bacteria's structure and properties.[65] As a result, the court found that the patented claim required undue experimentation because the field was poorly understood and "one of ordinary skill would need to assay each of at least tens of thousands of candidates" within the claimed genus to practice the claim.[66]

In addition to the holding, the court explained when experimentation is permissible versus when it is unreasonable.[67] "Even 'a considerable amount of experimentation is permissible,' as long as it is 'merely routine' or the specification 'provides a reasonable amount of guidance' regarding the

60. 3 DONALD S. CHISUM, CHISUM ON PATENTS § 7.03(d)(i) (Mathew Bender & Company, Inc. 2020).

61. *Id.*

62. *Id.* § 7.03(d)(i)(B).

63. Wyeth & Cordis Corp. v. Abbott Labs., 720 F.3d 1380, 1385-86 (Fed. Cir. 2013).

64. *Id.*

65. *Id.* at 1382.

66. *Id.* at 1386.

67. *Id.* at 1385-86.

direction of experimentation."[68] However, experimentation is unreasonable if a specification provided "only a starting point, a direction for further research," or required an "iterative, trial-and-error process to practice the claimed invention even with the help of the . . . specification."[69]

B. Observation Two: Overbreadth of the Claim

Many Federal Circuit biotechnology method patent cases involving unpredictability that have failed the enablement requirement did so because the breadth of the claim overreached its bounds when applied to diverse and poorly understood groups.[70] The court first addressed this overbreadth issue related to unpredictability in the 1991 bacteria gene-expression case *In re Vaeck*.[71] There the court explained that "[i]t is well settled that patent applicants are not required to disclose every species encompassed by their claims, even in an unpredictable art."[72] "However, there must be sufficient disclosure, either through illustrative examples or terminology, to teach those of ordinary skill how to make and how to use the invention as broadly as it is claimed."[73] The court further stated that where "a claimed genus represents a diverse and relatively poorly understood group . . . the required level of disclosure will be greater than, for example, the disclosure of an invention involving a 'predictable' factor such as a mechanical or electrical element."[74]

Following *In re Vaeck*, the court offered further guidance on what is meant by "a claimed genus [that] represents a diverse and relatively poorly understood group."[75] For example the court concluded that a biotechnology method patent for the transformation of an exogenous human EPO gene into mammalian cells was enabled.[76] In *Amgen Inc.*, the method patent holder was successful in proving enablement for all mammalian cells—the mammalian cells disclosed were monkey cells—because a PHOSITA would infer that "all mammalian cells produce and secrete hormones like EPO by means of the same

68. *Id.* at 1386 *(*citing Johns Hopkins Univ. v. CellPro, Inc., 152 F.3d 1342, 1360–61 (Fed. Cir. 1998)); *see* Promega Corp. v. Life Techs. Corp., 773 F.3d 1338, 1349 (Fed. Cir. 2014).

69. *Wyeth & Cordis Corp.*, 720 F.3d at 1386 (citing ALZA Corp. v. Andrx Pharm., LLC, 603 F.3d 935, 941, 943 (Fed. Cir. 2010)).

70. *See* 3 CHISUM, *supra* note 58, § 7.03(d)(i)(B)(I).

71. *In re* Vaeck, 947 F.2d 488 (Fed. Cir. 1991).

72. *Id.* at 496 *(*citing *In re* Angstadt, 537 F.2d 498, 502–03 (C.C.P.A. 1976)).

73. *Vaeck*, 947 F.2d at 496 (citing *In re* Marzocchi, 439 F.2d 220, 223 (C.C.P.A. 1971)).

74. *Vaeck*, 947 F.2d at 496.

75. *Id.*; *See* 3 CHISUM, *supra* note 58, §§ 7.03(d)(i)(B)(I), (III), and (VIII).

76. Amgen Inc. v. Hoechst Marion Roussel, Inc*.,* 314 F.3d 1313, 1320 (Fed. Cir. 2003), *remanded to* 330 F. Supp.2d 202 (D. Mass. 2004), *and vacated and remanded to* 457 F.3d 1293 (Fed. Cir. 2006), *and reh'g and reh'g en banc denied*, 469 F.3d 1039 (Fed. Cir. 2006).

fundamental processes."[77] Thus, the EPO hormone process for mammalian cells was deemed to either lack diversity or be relatively understood.[78]

To the contrary, the court held that a biotechnology method patent for the genetic modification of plants lacked enablement in its attempt to claim other types of plants.[79] In, *In re Goodman*, the patent holder presented a single example of the genetic modification method specific to dicotyledonous ("dicot") plants, but also claimed the genetic modification method for monocotyledonous ("monocot") plants without citing a monocot example.[80] To determine whether the monocot plants constituted a diverse or poorly understood group, the court consulted expert articles published on the method.[81] Each consulted article failed to conclude that the method would have comparable results for monocot plants at the time of filing.[82] As a result, the court found that the monocot plants were a claimed genus that represented a diverse and relatively poorly understood group.[83] Because the method's applicability to these plants was not known or evidenced, the court concluded that "practicing a gene transformation method for all monocot plants . . . would have required extensive experimentation that would preclude patentability."[84]

Thus, when analyzing enablement in unpredictable method patents, the claim will likely lack enablement when its breadth attempts to cover a species within a genus that is not known by experts, or evidenced enough to perform the same fundamental process.

C. Observation Three: Enablement of Entire Claim Must be Possible at the Time of Filing

The third observation presented by the Federal Circuit was that the breadth of the entire claim must be possible at the time of the patent filing.[85] "Naturally, the specification must teach those of skill in the art 'how to make and how to use the invention as broadly as it is claimed' [at the time of filing]."[86] If the applicability is not known to a portion of the genus at that time, then "the

77. *Id.* at 1335.
78. *Id.* at 1336–37.
79. *In re* Goodman, 11 F.3d 1046, 1052 (Fed. Cir. 1993).
80. *Id.* at 1050.
81. *Id.* at 1050–52.
82. *Id.*
83. *Id.*
84. *Id.* at 1052
85. *See In re* Wands, 858 F.2d 731, 737 (Fed. Cir. 1988).
86. *Goodman*, 11 F.3d at 1050 (citing *In re* Vaeck, 947 F.2d 488 (Fed. Cir. 1991)).

teachings in the specification do not cure this unpredictability" because the PHOSITA would require undue experimentation.[87]

In addition the court has opined that a method patent cannot claim an unresolved and never before completed method made possible by the patented method that is also specified.[88] Despite the possibility that a subsequent patentable method could result from the original patented method, the unpredictability of this subsequent method cannot be cured by the specification.[89] As a result, the subsequent method should be filed under a separate patent if the method can meet the other patentability requirements.[90]

D. Applicability to Artificial Intelligence-Assisted Method Patents

Despite the lack of adjudication for artificial intelligence-assisted method patents, artificial intelligence's inherent unpredictability draws a parallel to these biotechnology decisions. This parallel is useful when envisaging how the court would apply enablement analysis to new unpredictable invention methods. However, when examining each observation through the lens of artificial intelligence assistance, it appears unlikely that these types of patents would survive enablement scrutiny.

Concerning observation one, it is unlikely that an inventor could evidence the beyond a starting point experimentation requirement that is heightened for unpredictable subject matter. The requirement would fail because artificial intelligence-assisted experimentation would not be considered routine, and it would be far too challenging for an inventor to document reasonable guidance on the direction of the experimentation. Without access to similar artificial intelligence technology, the court would likely analyze all experimentation on a trial-and-error basis.

In addition, observation two's reliance on the subject matter genus of a method may be too elusive to identify with any certainty for artificial intelligence given its inherent complexity. Even if the genus was able to be reasonably identified, the drawing line of whether the claim's breadth covers fundamentally the same process would be a line not easily drawn by less experienced federal courts or experts in the field.

Lastly because enablement analysis is based on technology available in the field at the time of filing under observation three, it is unlikely that these technological advances would be considered available for the entire breadth of

87. *Goodman*, 11 F.3d at 1052.

88. Genentech, Inc. v. Novo Nordisk, 108 F.3d 1361, 1366 (Fed. Cir. 1997), *cert. denied*, 522 U.S. 963 (1997).

89. *Id.*

90. *Id.*

a claimed artificial intelligence-assisted method without the complete disclosure of the artificial intelligence used. Plus, if the court looks for evidence of method substantiation at the time of filing, it is not likely that experts would be able to speak to the breadth of the claims. Because any subsequent methods resulting from the method at issue cannot be enabled, an unpredictable method patent would be only offered narrow protection by the federal courts.

V. CREATING AN ARTIFICIALLY INTELLIGENT FUTURE

As patent law sits on the precipice of artificial intelligence-assisted invention caselaw, the federal courts currently have two available routes of pliability. The first is modifying the existing enablement analysis. The second is making specifications using artificial intelligence in any capacity facially invalid. If patent law is to remain as it is currently constructed, the latter route will be taken and the enablement standard would likely deny patentability for all inventions assisted by artificial intelligence. This inaction would side-step a complicated legal issue and would directly oppose a goal of patent law—incentivizing invention.[91] For the sake of clarity and furtherance of invention incentive, patent law reform to accommodate artificial intelligence-assisted invention should be considered.

As a means of reform, patent law principles would be best preserved by incorporating a separate test for enablement. To do so, the federal courts could use a "person having ordinary skill and information system assistance in the art" ("PHOSISAITA") model. This PHOSISAITA model would allow patent claims to be viewed through the lens of a person aided by an ordinary intelligence system instead of a person who merely possesses ordinary skill in the art. This method would eliminate the initial requirement that a valid patent must be able to be performed by an expert person in that field without aid and allow the invention to proceed to undue experimentation analysis. Additionally, analysis through this more forgiving lens would serve to eliminate many of the concerns found in the undue experimentation analysis.

It is important to note, however, that if a PHOSISAITA standard is adopted, the current PHOSITA standard should remain operative for enablement review of all steps in the inventive process where artificial intelligence is not present. By keeping the PHOSITA standard in all parts of the process or specifications where artificial intelligence is not employed, the precedent of enablement analysis will be maintained.

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91. *See* 1 MENELL, LEMLEY & MERGES, *supra* note 1.

Next for artificial intelligence-assisted inventions, the *In re Wands* undue experimentation factors[92] could be modified for claims that involve artificial intelligence assistance. Specifically, the interpretation of factors one, two, three, six, and eight could be revised.

First, to revise the interpretation of the factors properly, the USPTO and the federal courts could require that the underlying source code and architecture of the artificial intelligence used at the date of invention or assistance must be filed along with the patent application. Although this may be extremely difficult to determine, the burden must remain on the applying party to provide documentation that could assist a PHOSITA in experimentation. The goal of the provided code and architecture would be to create a scrubbed dummy system or program that could be analyzed and used to perform the experimentation analysis. Due to the inherent complexities in artificial intelligence, the disclosed system or architecture should be treated as a tool of the PHOSITA and not a component part or claim of the patent itself.

Because many patent applicants may maintain their intelligent systems as trade secrets, or may fear the exposure of business resources to competitors, the publication of the patent filing would likely deter many inventors considering application. However, given the circumstances it is unlikely that enablement could exist in this context without providing some sort of intelligent system disclosure.

Second, once the disclosure of the artificial intelligence's scrubbed source code and architecture is provided, the *In re Wands* factors' breadth[93] could be modified to reflect a PHOSITA's use of that technology in its experimentation on a case-by-case basis. Such modifications could broaden the analysis of factors one, three, and six. Factor one's analysis[94] could be adjusted to require a quantity of experimentation predicated on the capabilities and efficiencies gained from the use of the disclosed program. Factor three's analysis[95] could be expanded to include examples available within the realm of intelligent systems similar to the applicant's disclosed program or system at the time of invention. Factor six's analysis[96] could be broadened to include the skills of utilizing and operating intelligent systems akin to the one disclosed with the application.

In addition, factors two and eight could be narrowed to require detailed documentation concerning the use of the disclosed system to ensure that

92. *In re* Wands, 858 F.2d 731, 737 (Fed. Cir. 1988).
93. *Id.*
94. *Id.*
95. *Id.*
96. *Id.*

experimentation is not undue. Factor two's analysis[97] could require that the patent application includes exact instances where the scrubbed intelligent system was used. Factor eight's analysis[98] could be limited to claims available with the aid of the intelligent system disclosed. These modifications could narrow the patent's right to what the disclosed intelligent system did and prevent the applicant from claiming a gambit of rights based on what their intelligent system can do.

It is imperative to note that these recommendations aimed at incorporating an increasingly common practice of invention into patent law serve as only one solution available to the USPTO and the federal courts. Just as the AIA's alteration of the enablement statutes[99] evidence that patent law is subject to evolve—much like artificial intelligence is an evolutionary technology—hopefully, Congress and the federal courts will take a more inclusive step toward accepting artificial intelligence-assisted invention patents in the coming years.

VI. CONCLUSION

Over the past century, United States patent law has continued to face new legal challenges spawned by technological advancement. Now as Congress and the federal courts advance through the twenty–first century, the role of the inventor, the process of the invention, and the substance of the invention have continued to evolve. A key evolution is the use of artificial intelligence-assisted invention. Although the enablement analysis provided by *In re Wands*[100] has offered helpful guidance when assessing patent claims in the recent past, analysis modifications are necessary if inventions created using artificial intelligence are to be patented in the future.

97. *Id.*
98. *Id.*
99. Leahy-Smith America Invents Act, 35 U.S.C. § 112(a) (2012).
100. *Wands*, 858 F.2d at 737.